

Program Educational Objectives (PEO's):

- ❖ To produce masters who would have developed a strong background in Nanoscience, Nanomaterials, Thin films and ability to use these tools in their chosen fields of specialization.
- ❖ To produce masters who have the ability to serve country in the R&D domain on solving the problems in existing engineering aspects using the cutting edge technology tool called nanotechnology.
- ❖ To produce masters who would attain professional competence through life-long learning such as advanced degrees, professional registration, and other professional activities.
- ❖ To produce masters who function effectively in a multi-disciplinary environment and individually, within a global, societal, and environmental context.
- ❖ To produce masters who would be able to take individual responsibility and to work as a part of a team towards the fulfilment of both individual and organizational goals.

Programme Outcomes (PO's) :

- ❖ An ability to independently carry out research/investigation development work to solve practical problems.
- ❖ An ability to write and present a substantial technical report/document.
- ❖ Students will demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.
- ❖ Recognize the need for multi-disciplinary technologies, exposure to modern tools, environmental sustainability and ability to attain lifelong learning in the broader context of Nano Technology challenges.

Course outcomes
M.Tech(NanoTechnology)
M.Tech Sem-I (NanoTechnology)

Core Course I

NT-101 PROPERTIES OF NANO STRUCTURES

Course Outcomes:

1. To develop knowledge about the electronic properties of semiconductor devices.
2. To construct the magnetic properties of bulk nano structured materials.
3. To visualize the effect of optical properties of various materials.
4. Students can able to acquire knowledge based on the thermal properties of nanomaterials.
5. To understand advanced mechanical properties of nanostructured materials.

Core Course II

NT-102 SYNTHESIS OF NANOMATERIALS

Course Outcomes:

1. To assess the Top down and Bottom up synthesis techniques of nano structured materials.
2. To determine the physical routes involved in synthesis of nano structured materials.
3. Student can able to validate the thermolysis based approaches in preparation of nano structured material.
4. To study the biological synthesis methods involved in synthesis of Nanomaterials.
5. To understand and gain the knowledge to the scale up of nano materials.

Core Course III

NT-103 MATERIAL CHARACTERIZATION TECHNIQUES

Course Outcomes:

1. To evaluate the spectroscopic characterization techniques of nano materials.
2. To compare various compositional and structural characterization techniques.
3. To infer the importance of advanced characterization techniques.
4. Student can able to develop knowledge about various electrical and magnetic characterization technique.
5. Gain overall knowledge of various thermal and magnetic characterization techniques.

Core Elective-I

NT-104: STRUCTURE, BONDING AND QUANTUM MECHANICS

Course Outcomes:

1. Student can able to theorize the importance of crystal structure for property evaluation.
2. Student can asses different types of chemical bonding in materials.
3. To evaluate nano structured in quantum mechanical approaches.
4. Students can able to distinguish between classical electromagnetic theory and quantum mechanics.
5. To predict the free electron gas theory of metals and in Hydrogen atom.

Core Elective-I

NT-104: INTRODUCTION TO NANO SCIENCE & NANO TECHNOLOGY

Course Outcomes:

1. To discuss the basic concepts of nano technology.
2. To understand the importance of nano biotechnology
3. To study the influence of nanotechnology in the field of environment and toxicology.
4. To evaluate the concepts of nano electronics.
5. To classify the applications of nano materials.

Open Elective-I

NT-105: NANO BIO-TECHNOLOGY, MATERIALS & DEVICES

Course Outcomes:

1. Students can able to develop deep understanding of fundamental concepts of biotechnology.
2. Student can able to compile all the biological nano structures and their applications.
3. To know the importance of nano technology in medical field.
4. To prioritize the role of nano structured materials in diagnosis.
5. To gain the improvements in drug delivery system using nanotechnology.

Open Elective-I

NT-105: ADVANCED CATALYSIS

Course Outcomes:

1. Students can able to develop deep understanding of fundamental concepts of biotechnology.
2. Student can able to compile all the biological nano structures and their applications.
3. To know the importance of nano technology in medical field.
4. To prioritize the role of nano structured materials in diagnosis.
5. To gain the improvements in drug delivery system using nanotechnology.

Laboratory-I

NT-106: SYNTHESIS, FABRICATION AND CHARACTERIZATION LAB

Course outcomes:

1. Gain knowledge on the synthesis techniques involved in experiments.
2. Students can acquire knowledge on equipment handling like XRD, PSA, UV etc.
3. To construct a theoretical knowledge on the experiment.
4. The ability to write and present the laboratory reports.
5. To maximize knowledge regarding synthesis and characterization of nanomaterials.

Laboratory-II

NT-107: SIMULATION LAB-I

Course Outcomes:

1. To gain knowledge on design and construction of carbon molecules.
2. Student can develop math work and gain knowledge on Mat-Lab.
3. To construct a theoretical knowledge on the experiment.
4. The ability to write and present the laboratory reports.
5. To maximize knowledge regarding simulation components.

Course Outcomes

M.Tech Sem- II (NanoTechnology)

Core Course-IV

NT-201: NANO SENSORS AND DEVICES

Course Outcomes:

1. To develop knowledge about Sensors, Characteristics, design and its Applications.
2. To persuade about the Physical Effects of Sensor.
3. To visualize the concept of Mass Sensitivity and Conductive Sensors.
4. To understand the importance of Electro Chemical Sensors and its measurement types.
5. Student can able attain knowledge on Thermometric & Optical sensors.

Core Course-V

NT-202: NANO ELECTRONICS AND NANO PHOTONICS

Course Outcomes:

1. To assess knowledge on Single Electron and few Electron phenomenon.
2. To determine theory behind Scanning Tunneling Microscope by Applications of Tunneling.
3. Study the basics of coulomb blockade in Quantum mechanics.
4. To persuade Single Electron Transistor and Carbon Nano tube Transistor.
5. To extend the knowledge on Spintronics and Nano photonics.

Core Course-VI

NT-203: CARBON NANOSTRUCTURES AND ITS APPLICATIONS

Course Outcomes:

1. Gain knowledge about Carbon nano Structures and its growth mechanism.
2. To compare various Synthesis Techniques of CNTs and Purification.
3. To upgrade our knowledge on Physical Properties of CNT.
4. To develop knowledge about Hydrogen Absorption using CNTS.
5. To compile knowledge of various applications of CNTs in diverse fields.

Core elective-II

NT-204: NANO TECHNOLOGY FOR ENERGY SYSTEMS

Course Outcomes:

1. Study the basic Energy need and role of Battery materials
2. To grade up knowledge of Super Capacitors, and its Applications.
3. Study the role of nano structured material to meet Energy Challenges.
4. Learn about the concept of Hydrogen Storage Technology.
5. Gain knowledge on role of Fuel Cell Technology.

Core elective-II

NT-204 NANO COMPOSITES DESIGN AND SYNTHESIS

Course Outcomes:

1. Student can able to discuss the basic concepts of Nano Composites.
2. Student can able to prioritize the role of Ceramic Metal Composites in Nano Technology.
3. To understand the role of Synthesis Methods for various Nano Composite materials.
4. Learn about the concepts of Indentations and types of Indentations.
5. Correlate the applications of Polymer Nano Composites and Impregnation Techniques.

Open elective-II

NT-205: SCIENCE AND TECHNOLOGY OF THIN FILMS

Course Outcomes:

1. To develop deep understanding on Vacuum Technology.
2. To compile all the Conditions for formation of thin films
3. To know the importance of Physical Vapor Deposition techniques.
4. To prioritize the role of Electrical discharges used in Thin Film Deposition
5. To improve the understanding of deposition using CVD.

Open elective-II

NT-205: LITHOGRAPHIC TECHNIQUES

Course Outcomes:

1. To discuss about Lithography and Optical Lithography
2. To formulate the role of Electron Lithography
3. To construct the idea of X-ray Lithography
4. To improve our knowledge in Ion Lithography
5. To understand the importance of Lithography based on Surface Instabilities

Laboratory-III

NT-206: NANOSTRUCTURED MATERIAL APPLICATION LAB

Course outcomes:

1. To gain overall knowledge on synthesis, characterization and application of nanomaterials.
2. Students can acquire knowledge on equipment handling like Cyclic voltammetry, Anti bacterial applications, gas sensor etc.
3. To construct a theoretical knowledge on the experiment.
4. The ability to write and present the laboratory reports.
5. To maximize knowledge regarding synthesis, characterization and applications of nanomaterials.

Laboratory-IV

NT-207: SIMULATION (NANO HUB+QUANTUM WISE) LAB-II

Course outcomes:

1. To familiarize students about applying various material design and data analysis.
2. To help in understanding the theoretical modeling of semiconductor devices and quantum structures using online in- browser simulation tools.
3. To construct a theoretical knowledge on the experiment.
4. The ability to write and present the laboratory reports.
5. To maximize knowledge regarding simulation tools.